FIG. 1

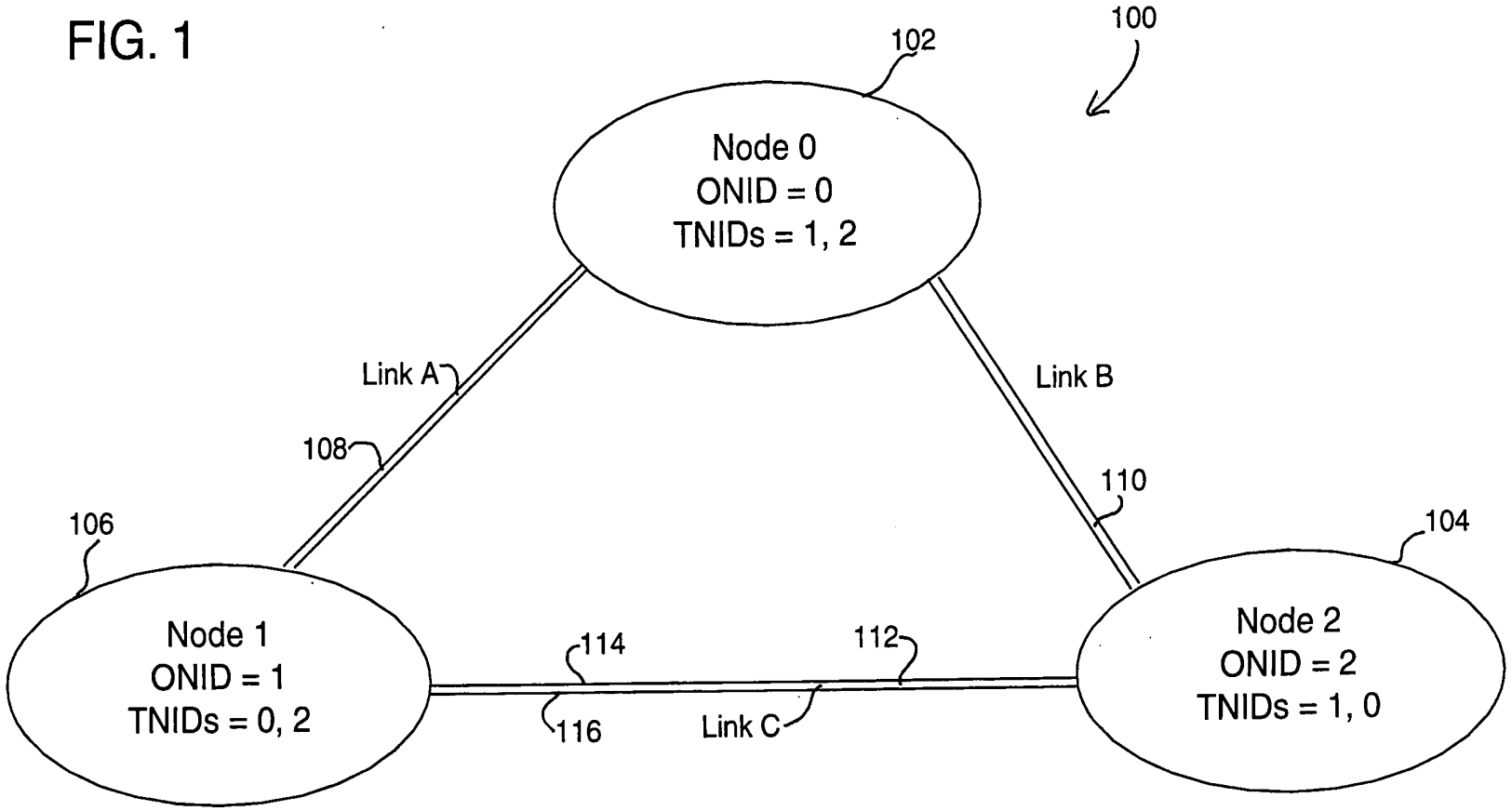

100
102
Node 0
ONID = 0
TNIDs = 1, 2
Link A
Link B
108
110
106
104
Node 1
ONID = 1
TNIDs = 0, 2
114
112
116
Link C
Node 2
ONID = 2
TNIDs = 1, 0

FIG. 2

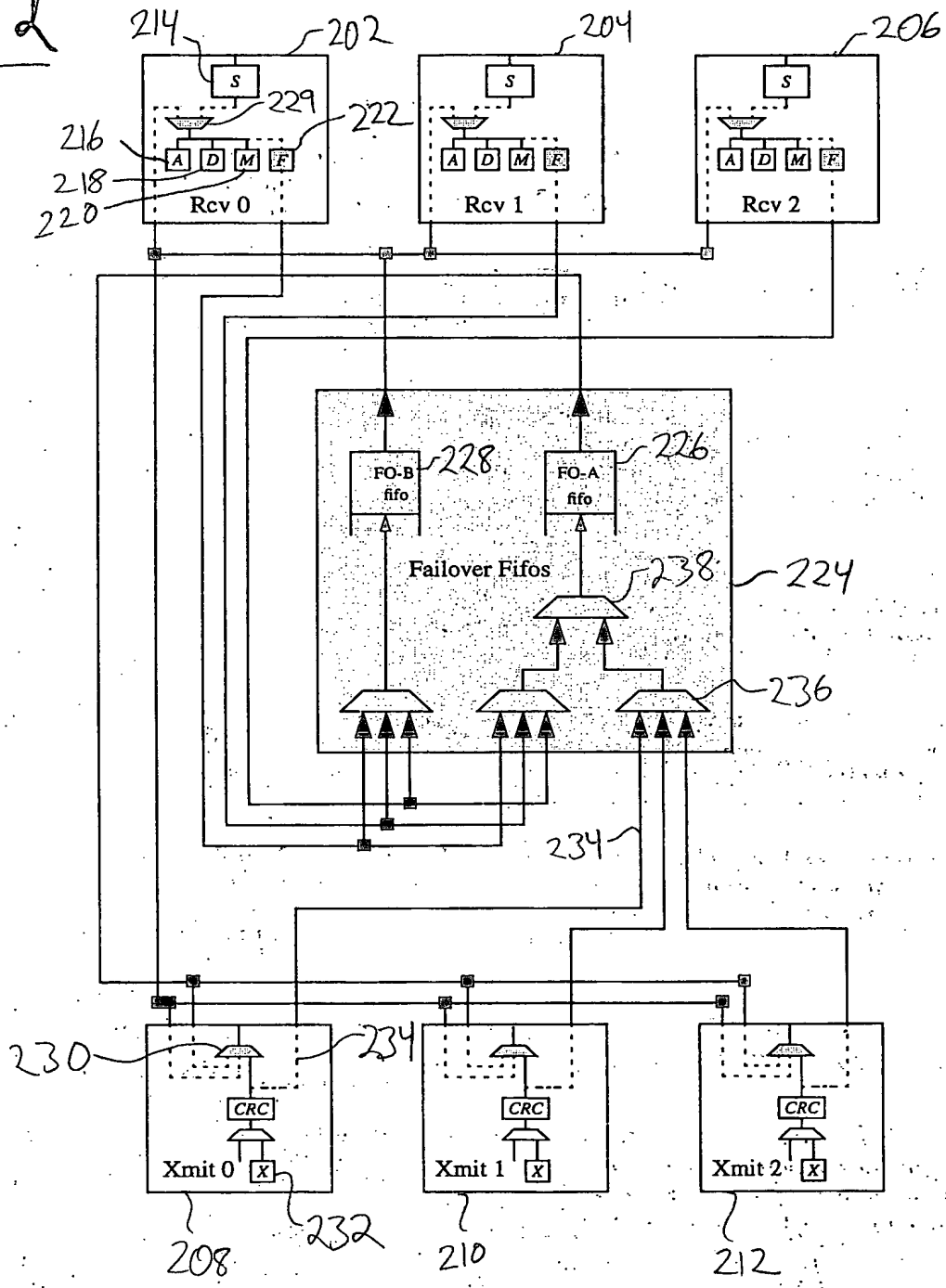

214
202
204
206
S
229
222
216
218
220
A
D
M
F
Rcv 0
Rcv 1
Rcv 2
FO-B fifo
228
FO-A fifo
226
Failover Fifos
238
224
236
234
230
CRC
Xmit 0
Xmit 1
Xmit 2
X
232
208
210
212

FIG. 3A

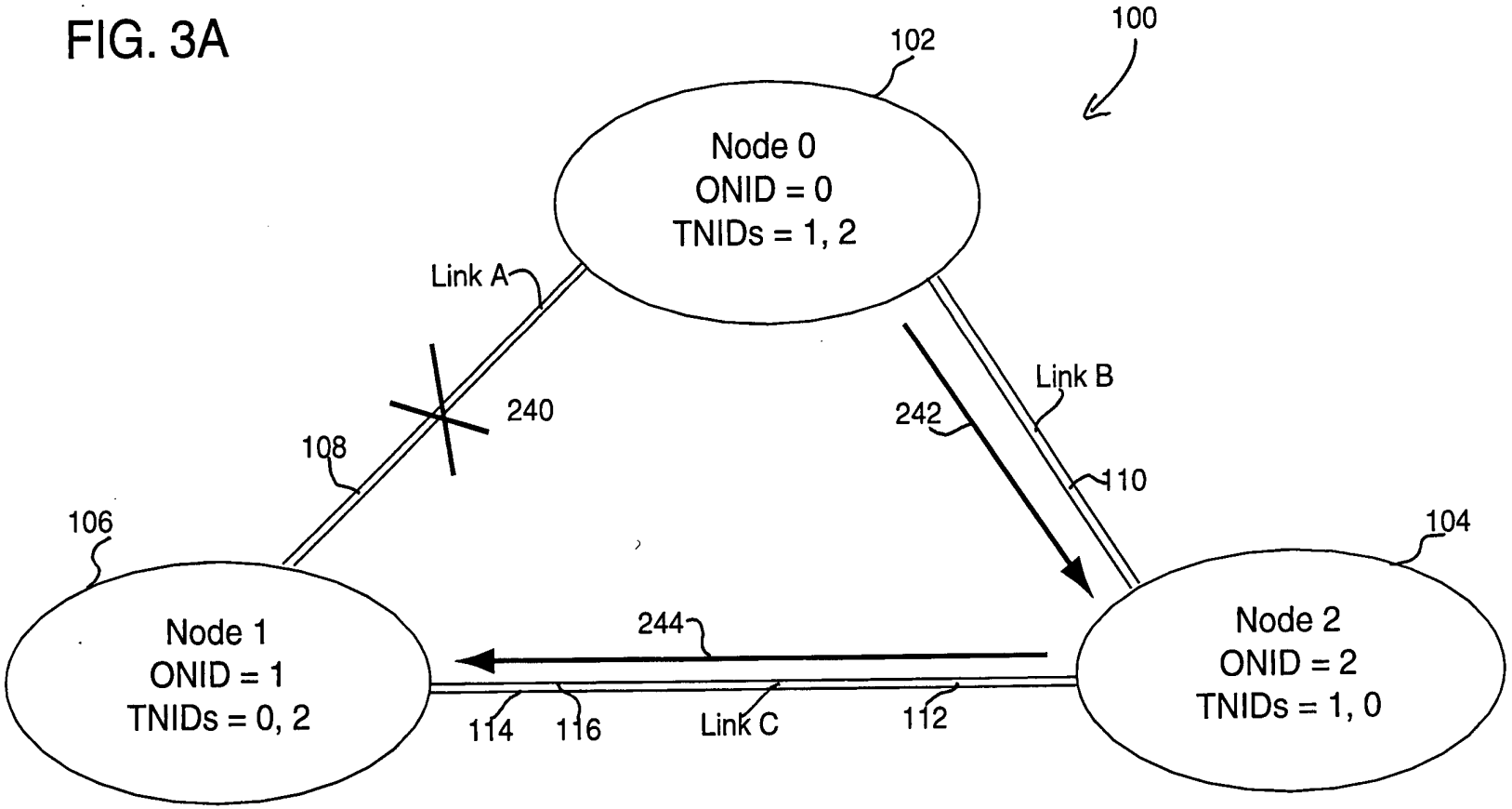

100
102
Node 0
ONID = 0
TNIDs = 1, 2
Link A
Link B
240
242
108
110
106
104
Node 1
ONID = 1
TNIDs = 0, 2
244
Node 2
ONID = 2
TNIDs = 1, 0
114
116
Link C
112

FIG. 3B

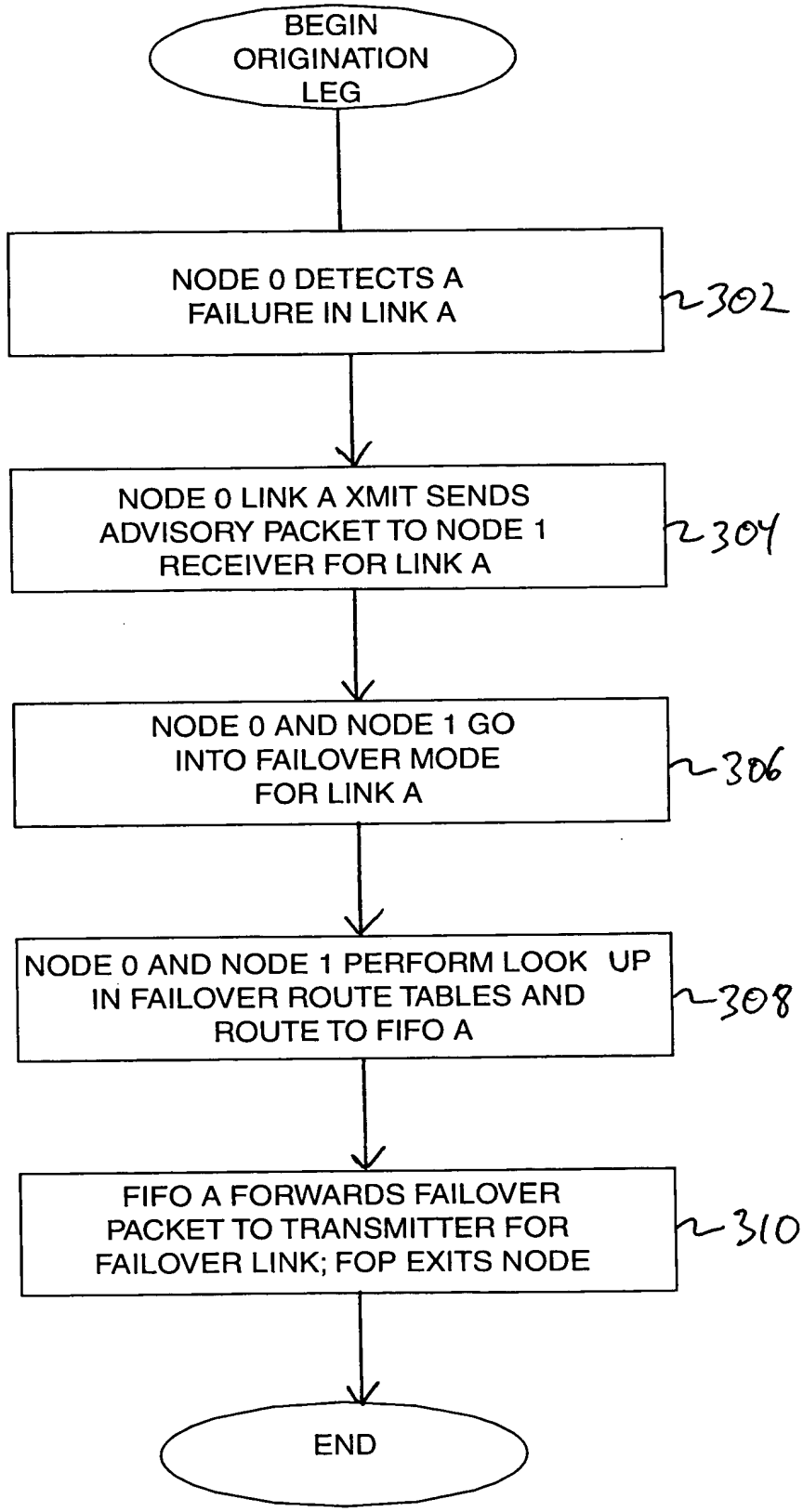

BEGIN ORIGINATION LEG
NODE 0 DETECTS A FAILURE IN LINK A
302
NODE 0 LINK A XMIT SENDS ADVISORY PACKET TO NODE 1 RECEIVER FOR LINK A
304
NODE 0 AND NODE 1 GO INTO FAILOVER MODE FOR LINK A
306
NODE 0 AND NODE 1 PERFORM LOOK UP IN FAILOVER ROUTE TABLES AND ROUTE TO FIFO A
308
FIFO A FORWARDS FAILOVER PACKET TO TRANSMITTER FOR FAILOVER LINK; FOP EXITS NODE
310
END

FIG. 4

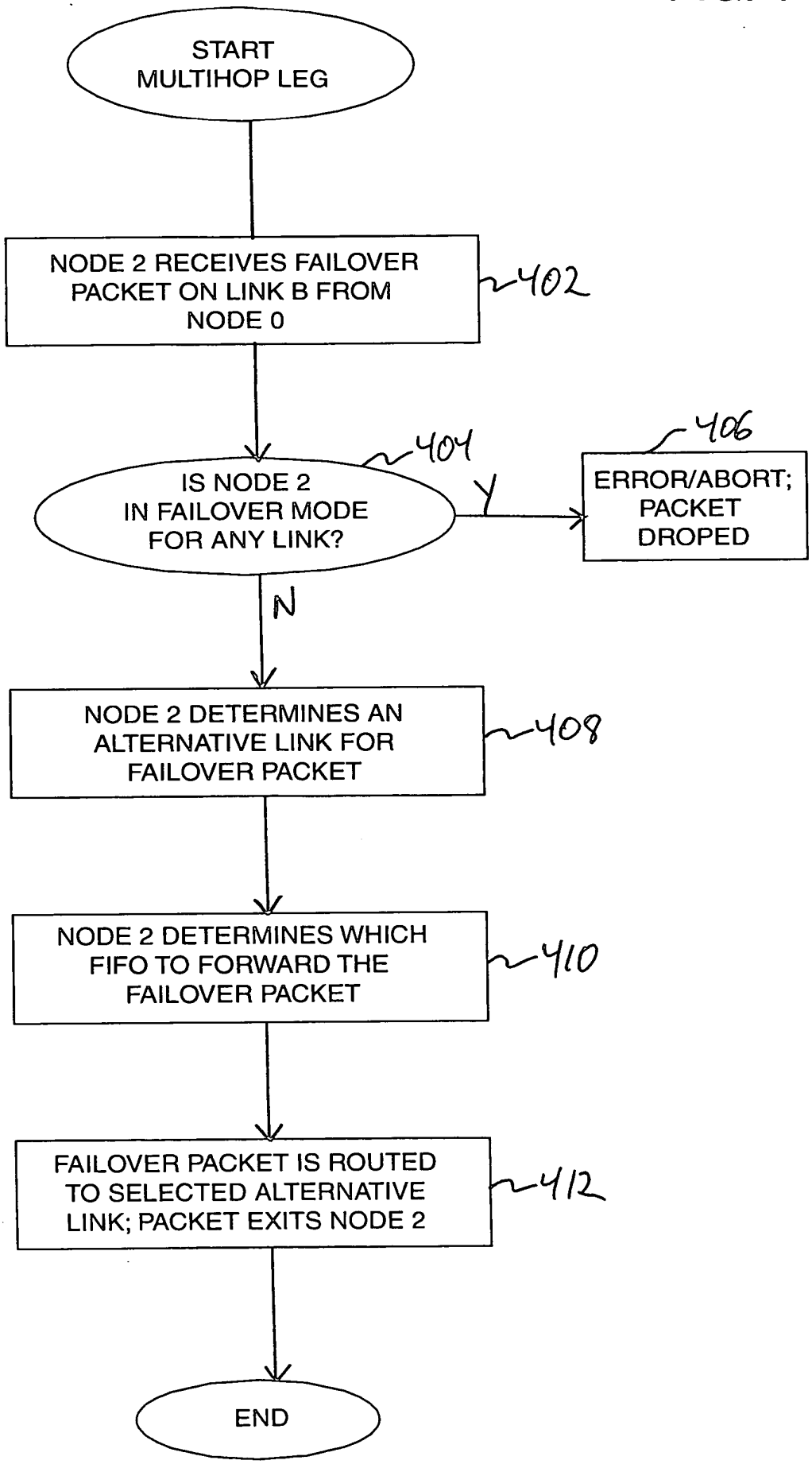

START MULTIHOP LEG
NODE 2 RECEIVES FAILOVER PACKET ON LINK B FROM NODE 0
402
IS NODE 2 IN FAILOVER MODE FOR ANY LINK?
404
Y
406
ERROR/ABORT; PACKET DROPED
N
NODE 2 DETERMINES AN ALTERNATIVE LINK FOR FAILOVER PACKET
408
NODE 2 DETERMINES WHICH FIFO TO FORWARD THE FAILOVER PACKET
410
FAILOVER PACKET IS ROUTED TO SELECTED ALTERNATIVE LINK; PACKET EXITS NODE 2
412
END

FIG. 5

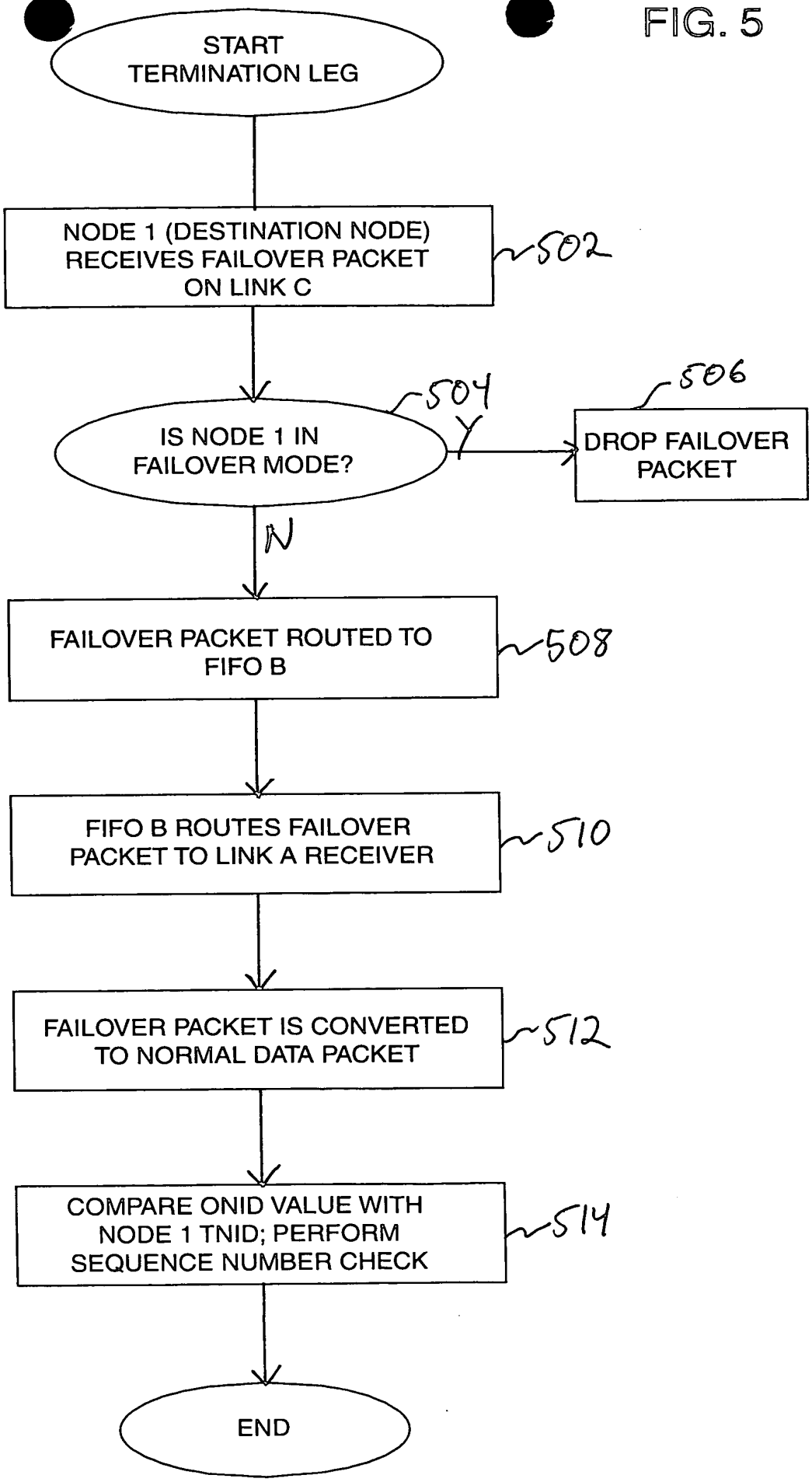

START
TERMINATION LEG
NODE 1 (DESTINATION NODE)
RECEIVES FAILOVER PACKET
ON LINK C
502
IS NODE 1 IN
FAILOVER MODE?
504
Y
506
DROP FAILOVER
PACKET
N
FAILOVER PACKET ROUTED TO
FIFO B
508
FIFO B ROUTES FAILOVER
PACKET TO LINK A RECEIVER
510
FAILOVER PACKET IS CONVERTED
TO NORMAL DATA PACKET
512
COMPARE ONID VALUE WITH
NODE 1 TNID; PERFORM
SEQUENCE NUMBER CHECK
514
END

FIG. 6

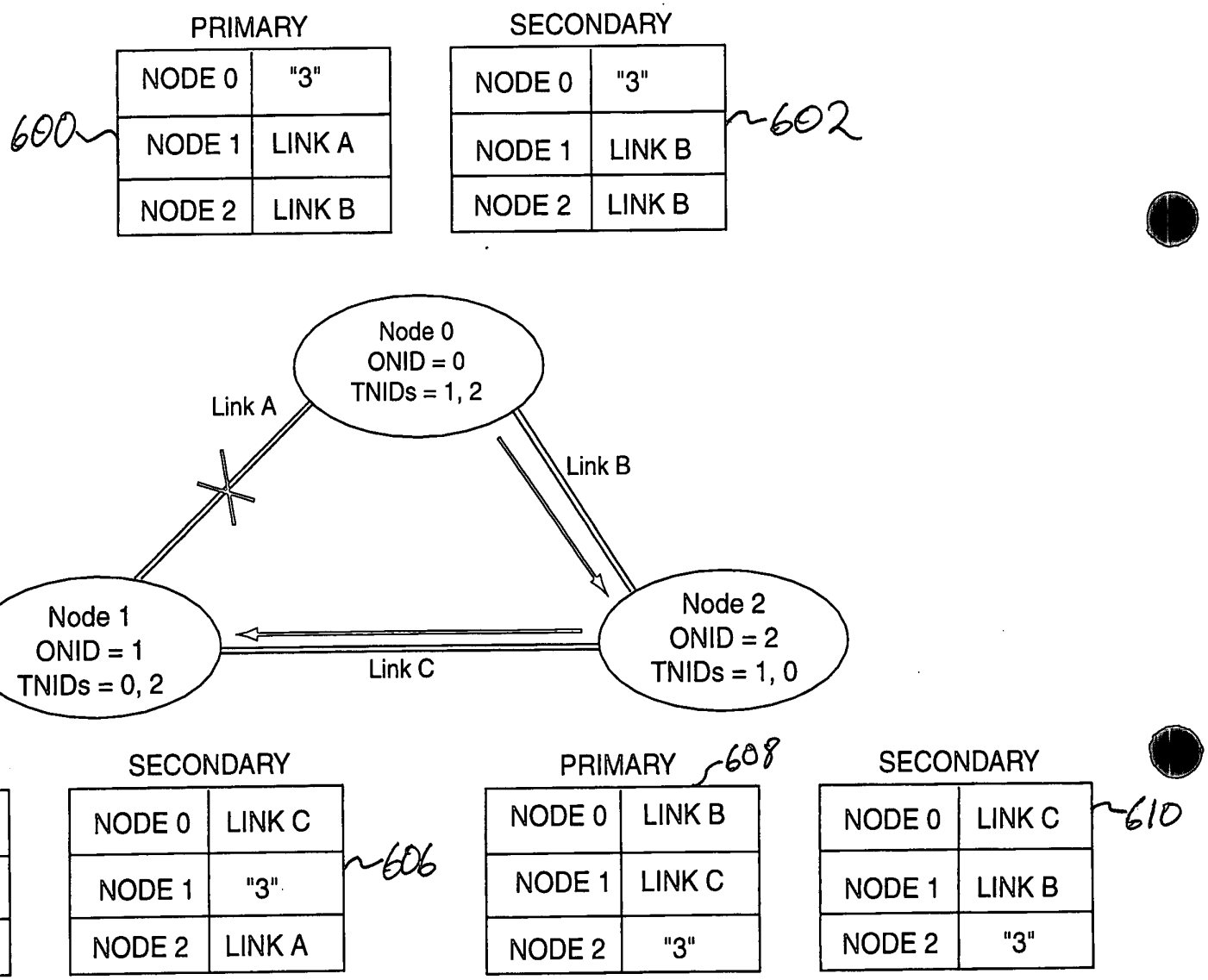

PRIMARY
NODE 0 "3"
NODE 1 LINK A
NODE 2 LINK B
600
SECONDARY
NODE 0 "3"
NODE 1 LINK B
NODE 2 LINK B
602
Node 0
ONID = 0
TNIDs = 1, 2
Link A
Link B
Node 1
ONID = 1
TNIDs = 0, 2
Link C
Node 2
ONID = 2
TNIDs = 1, 0
PRIMARY
NODE 0 LINK A
NODE 1 "3"
NODE 2 LINK C
604
SECONDARY
NODE 0 LINK C
NODE 1 "3"
NODE 2 LINK A
606
PRIMARY
608
NODE 0 LINK B
NODE 1 LINK C
NODE 2 "3"
SECONDARY
NODE 0 LINK C
NODE 1 LINK B
NODE 2 "3"
610

FIG. 7

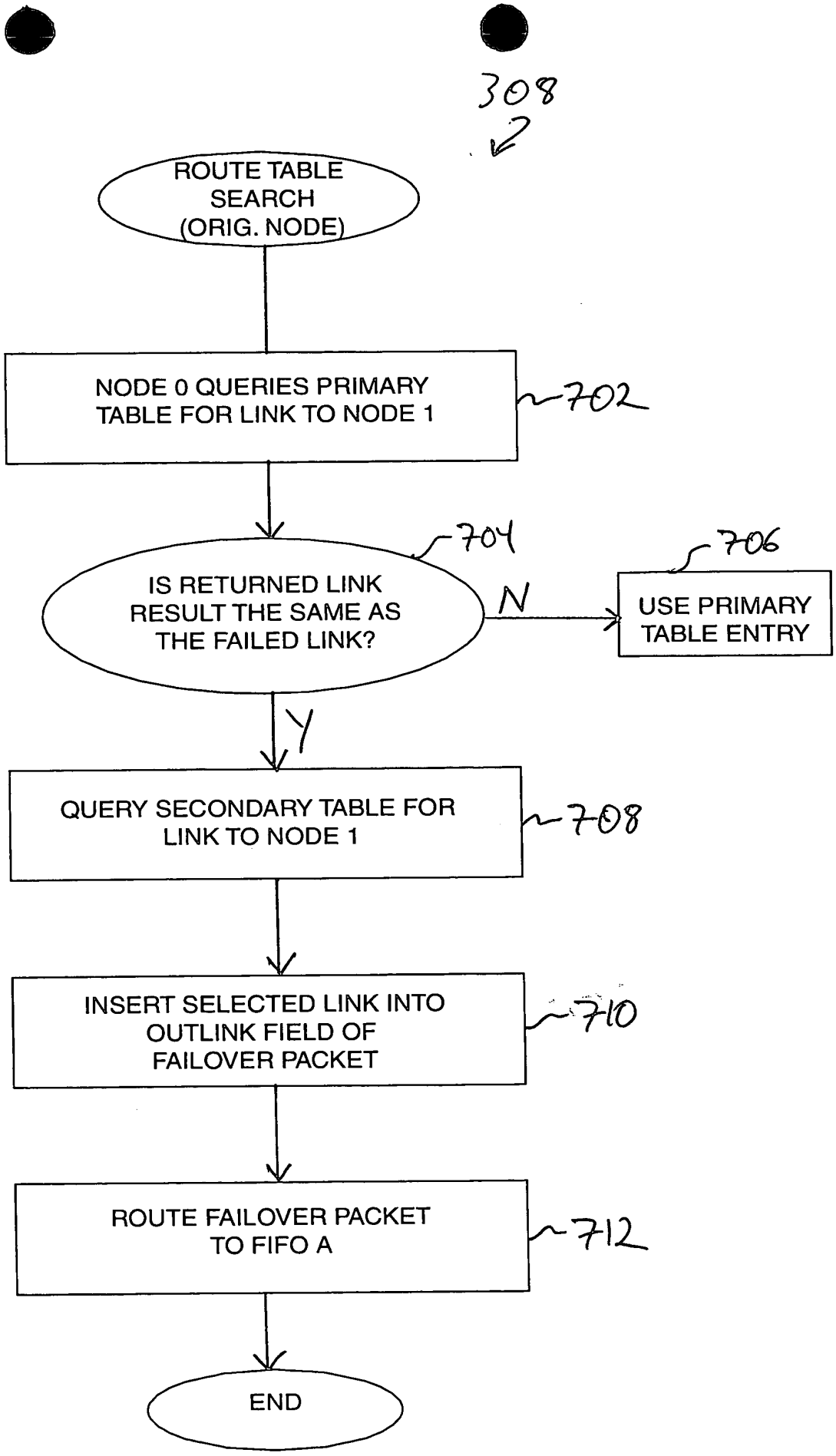

308
ROUTE TABLE SEARCH (ORIG. NODE)
NODE 0 QUERIES PRIMARY TABLE FOR LINK TO NODE 1
702
IS RETURNED LINK RESULT THE SAME AS THE FAILED LINK?
704
N
USE PRIMARY TABLE ENTRY
706
Y
QUERY SECONDARY TABLE FOR LINK TO NODE 1
708
INSERT SELECTED LINK INTO OUTLINK FIELD OF FAILOVER PACKET
710
ROUTE FAILOVER PACKET TO FIFO A
712
END

FIG. 8

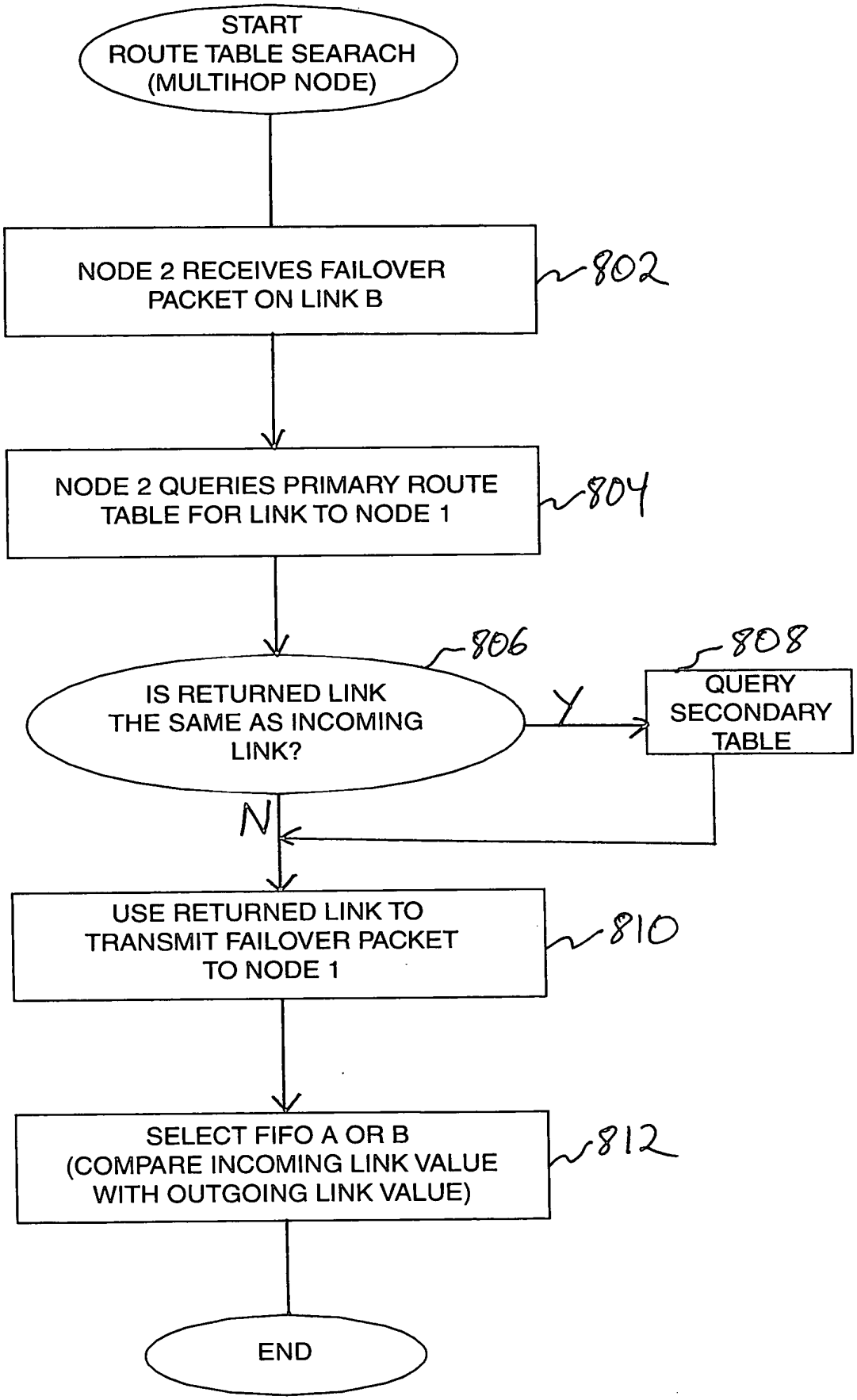
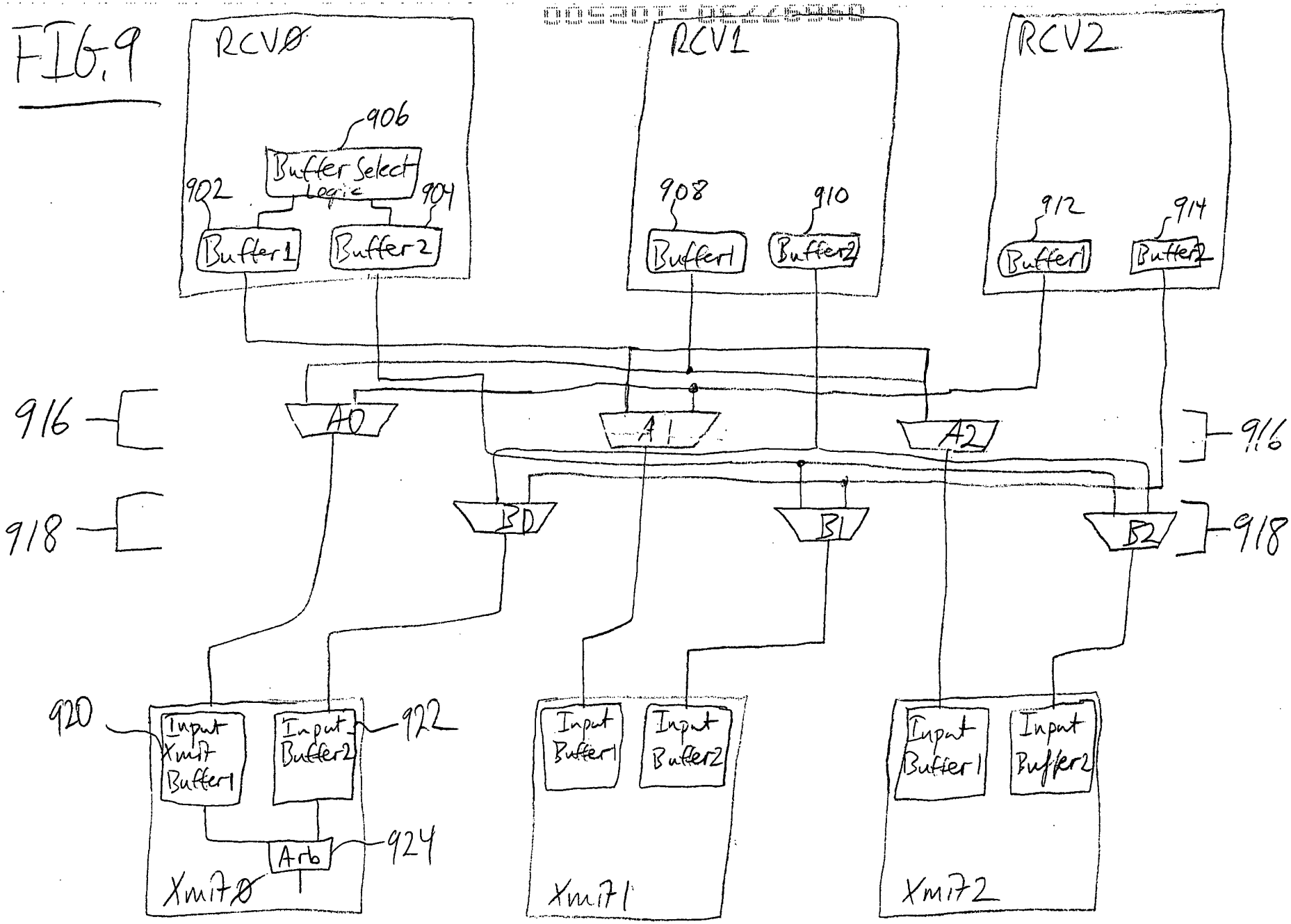

START
ROUTE TABLE SEARACH
(MULTIHOP NODE)
NODE 2 RECEIVES FAILOVER
PACKET ON LINK B
802
NODE 2 QUERIES PRIMARY ROUTE
TABLE FOR LINK TO NODE 1
804
806
IS RETURNED LINK
THE SAME AS INCOMING
LINK?
Y
808
QUERY
SECONDARY
TABLE
N
USE RETURNED LINK TO
TRANSMIT FAILOVER PACKET
TO NODE 1
810
SELECT FIFO A OR B
(COMPARE INCOMING LINK VALUE
WITH OUTGOING LINK VALUE)
812
END

FIG. 9


RCV0
RCV1
RCV2
906
Buffer Select Logic
902
904
Buffer1
Buffer2
908
910
912
914
916
A0
A1
A2
918
B0
B1
B2
920
Input Xmit Buffer1
Input Buffer2
922
924
Arb
Xmit0
Xmit1
Xmit2

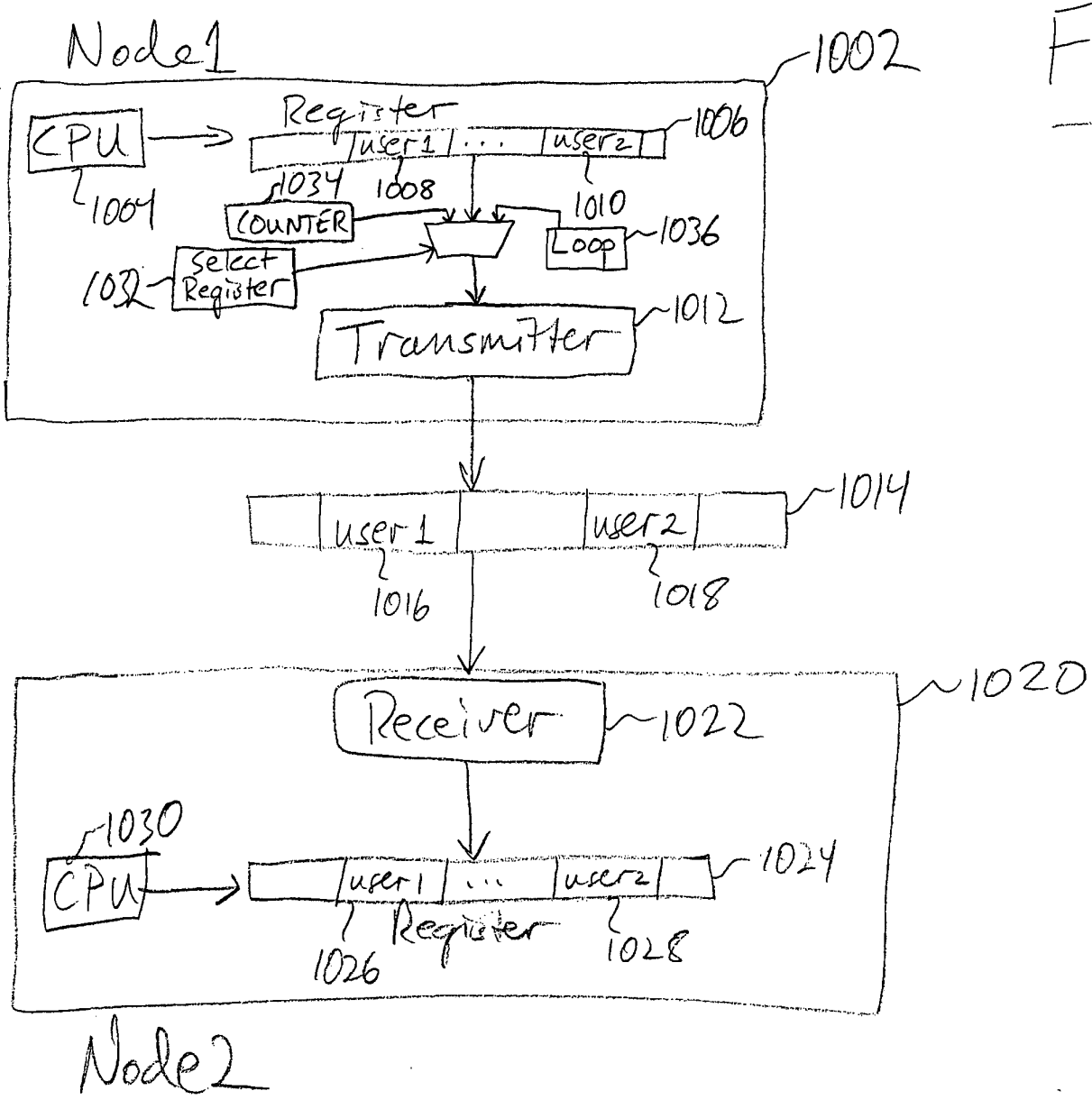

Node1
1002
CPU
1004
Register
user1
...
user2
1006
1008
1010
1034
COUNTER
Loop
1036
1032
Select Register
Transmitter
1012
1014
user 1
user 2
1016
1018
1020
Receiver
1022
1030
CPU
user1
...
user2
1024
Register
1026
1028
Node2

FIG. 10

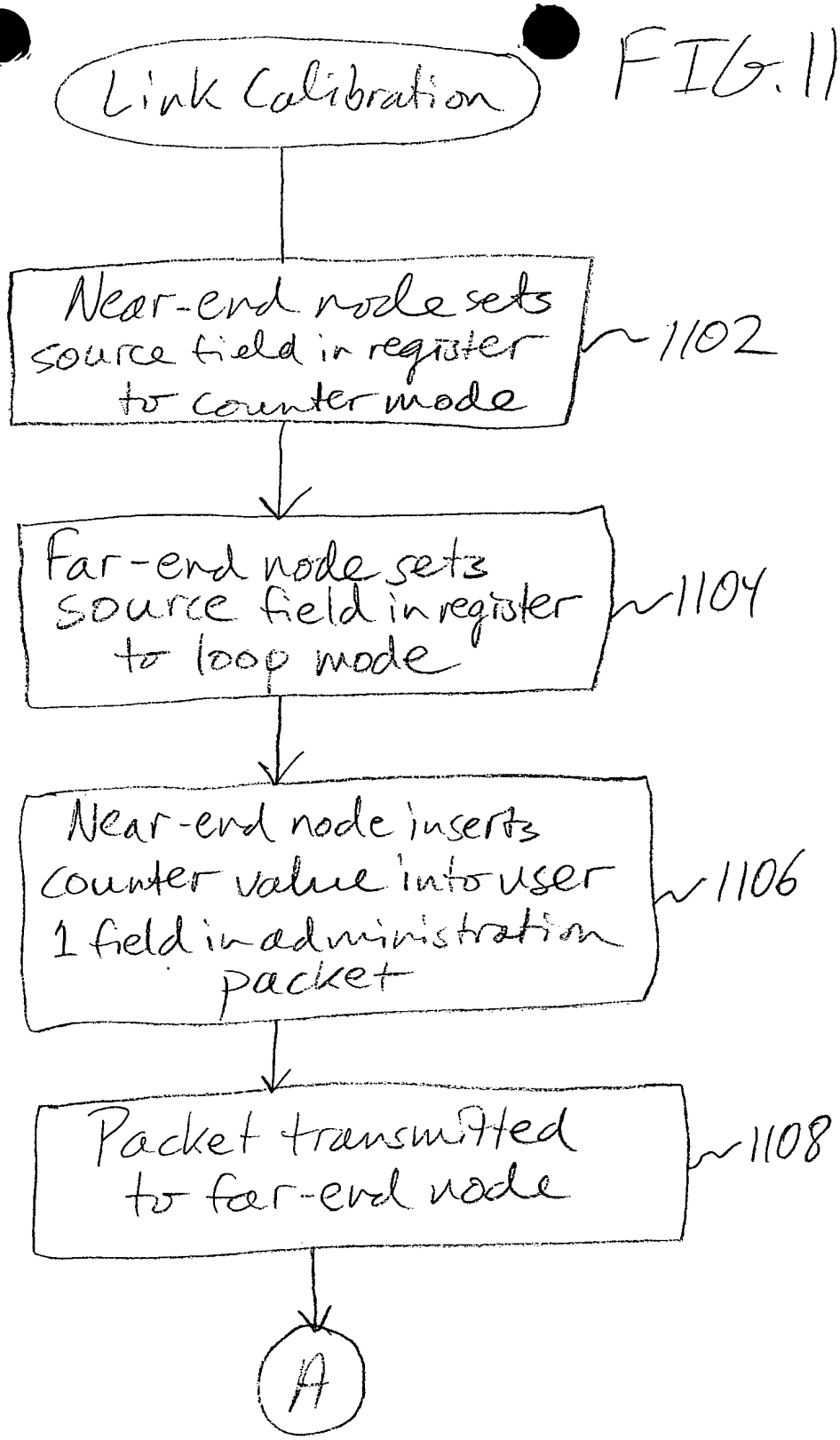

Link Calibration
Near-end node sets source field in register to counter mode
1102
Far-end node sets source field in register to loop mode
1104
Near-end node inserts counter value into user 1 field in administration packet
1106
Packet transmitted to far-end node
1108
A

FIG. 11A

FIG. 11B

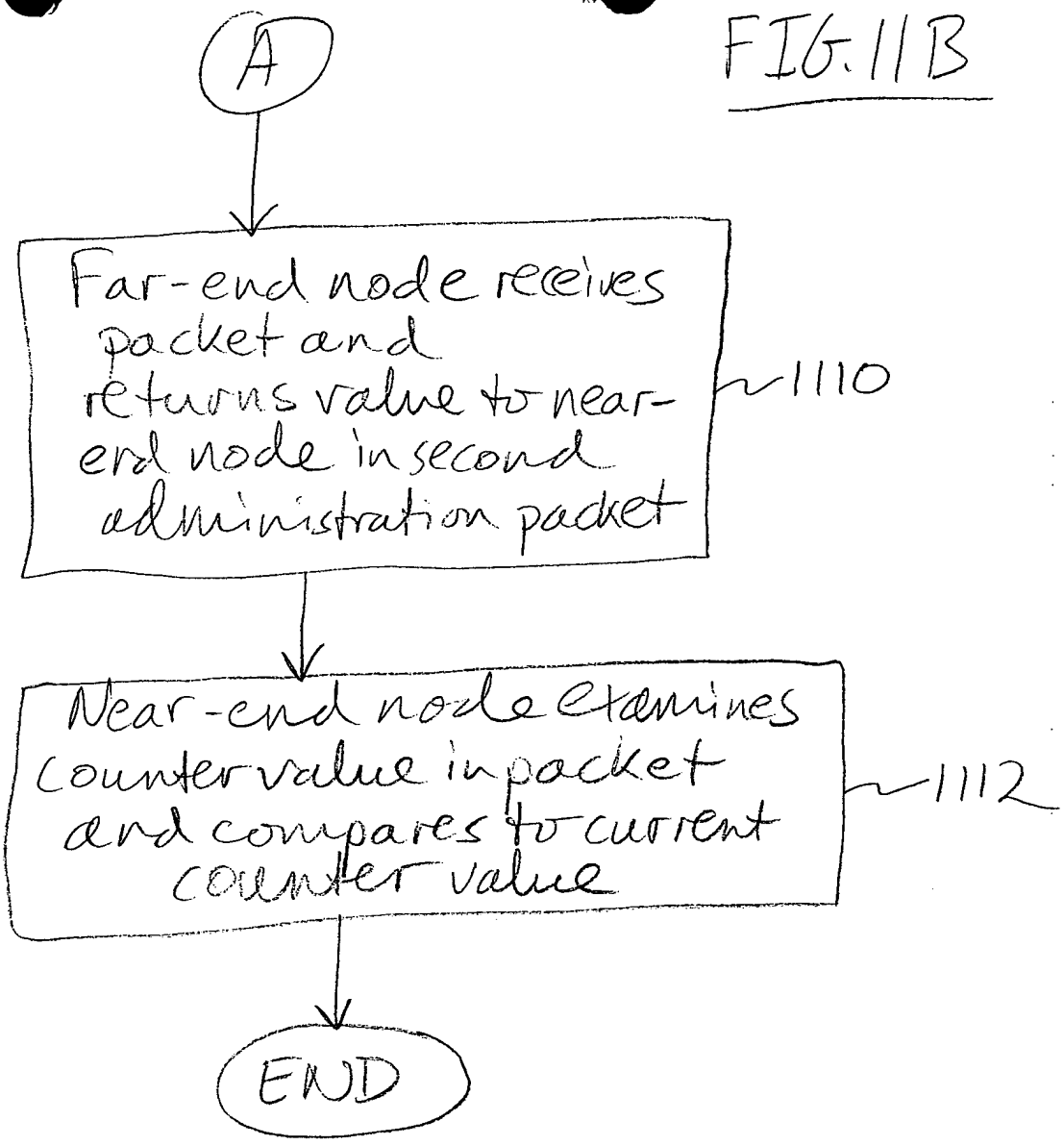
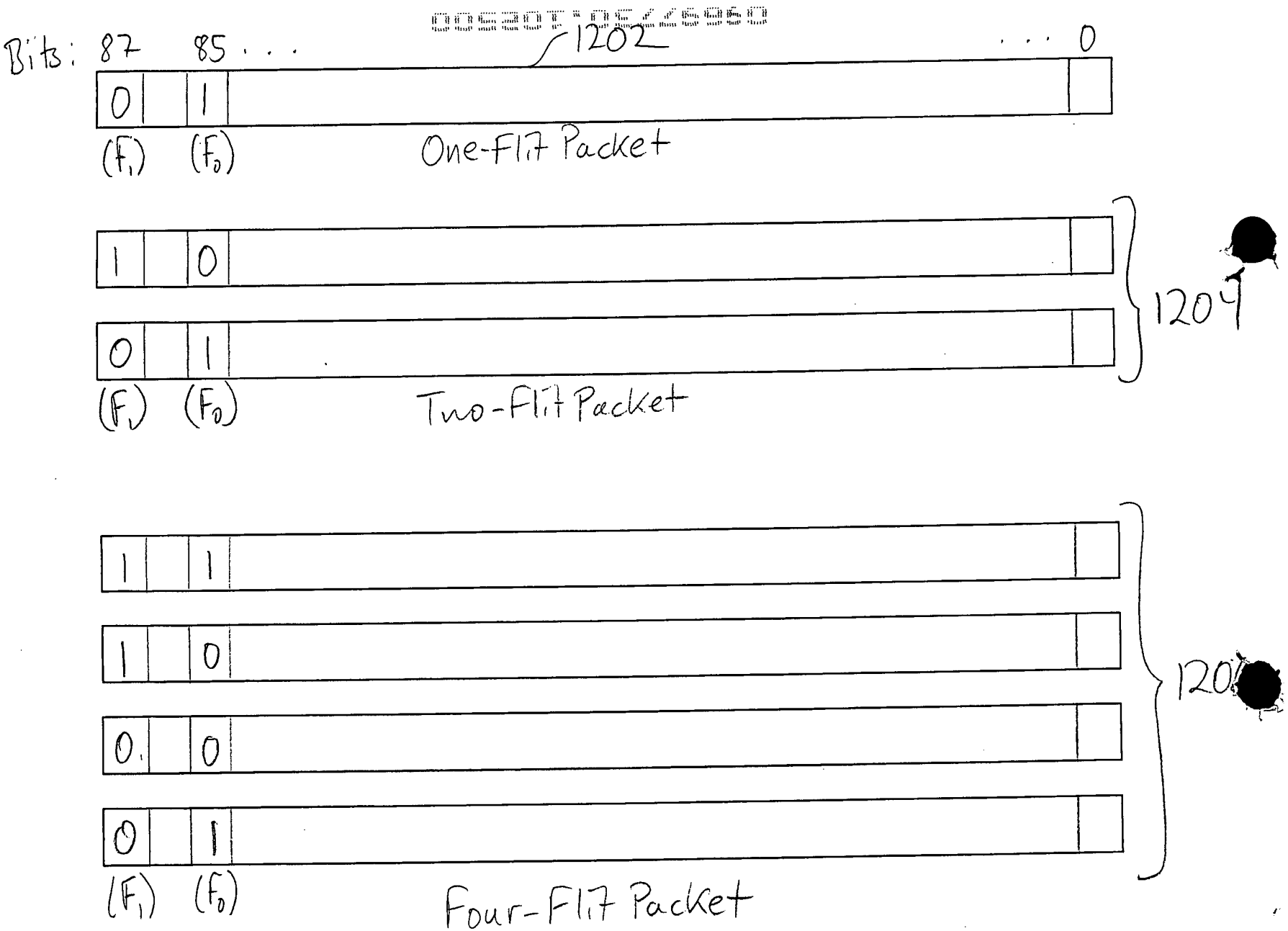

A
Far-end node receives packet and returns value to near-end node in second administration packet
1110
Near-end node examines counter value in packet and compares to current counter value
1112
END

FIG. 12


Bits: 87 85 . . . 1202 . . . 0
0
1
(F1) (F0)
One-Flit Packet
1
0
0
1
(F1) (F0)
Two-Flit Packet
1209
1
1
1
0
0.
0
0
1
(F1) (F0)
Four-Flit Packet
120